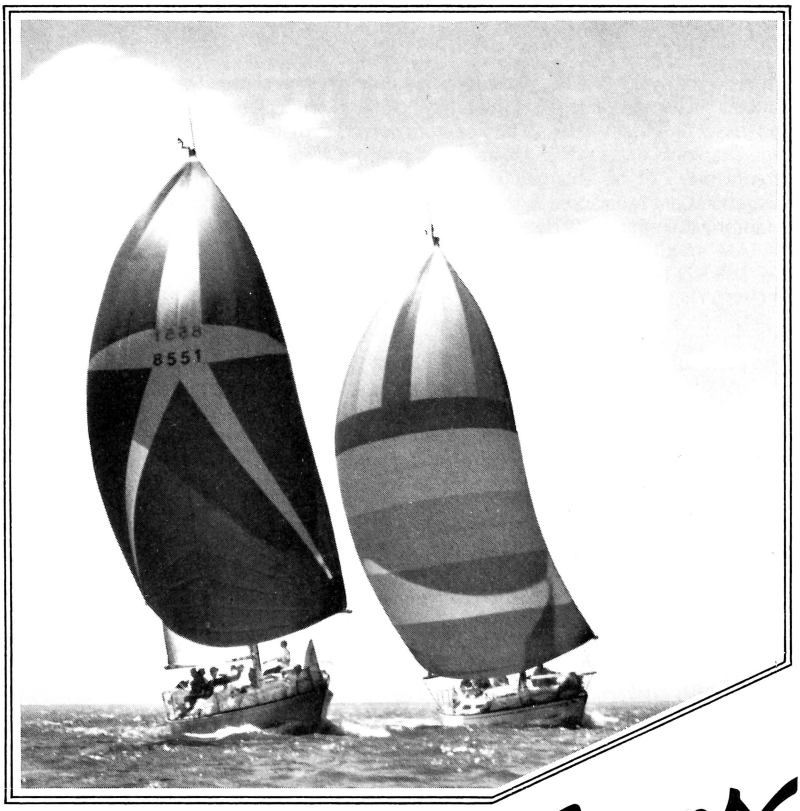
Bermuda Race

A challenging simulation of the race from Newport, R.I. to Bermuda.



DISKETTE

Apple II compatible systems (48K)
Applesoft in ROM - 1 disk drive (DOS 3.3)
Game Paddles or Joy Stick optional

by Sams™

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Bermuda Race

by John Biddle and Gordon Mattox

Sams™ Software

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LOADING INSTRUCTIONS

BERMUDA RACE is written for the Apple II, Apple II Plus, and Apple IIe computers. You must have at least 48K of memory, one disk drive (using DOS 3.3), and Applesoft in ROM or on a language (RAM) card. You have the option to use a color television or monitor to produce color output for the graphics; if necessary, you can use a monochrome monitor.

To run BERMUDA RACE, follow these steps:

1. With your computer turned off, insert the BERMUDA RACE program disk in drive one.
2. Turn your computer on. The disk drive will activate and, in a moment, you will see the BERMUDA RACE title screen.
3. Press **RETURN** to begin the simulation.

If you have an older Integer Apple equipped with a language (RAM) card, perform the following:

1. With your computer turned off, insert the DOS 3.3 system master (supplied by Apple) into drive one.
2. Turn your computer on. Applesoft should load into your language (RAM) card.
3. Remove the system master disk, and insert the BERMUDA RACE program disk into drive one.
4. Type PR#S **RETURN**, where S is the slot number of your disk controller card. Usually this is **6.**
5. The disk drive will activate and, momentarily, you will see the BERMUDA RACE title screen.
6. Press **RETURN** to begin the simulation.

If any step fails, turn your computer off, check all electrical connections (including pc board contacts), and repeat the procedure.

If such problems persist, contact your dealer who can help with almost any problem you encounter.

OVERVIEW

BERMUDA RACE is a computer simulation of the blue-water sailboat race from Newport, Rhode Island to the British island of Bermuda, some 635 miles off the coast of the United States in the Atlantic Ocean.

The simulation may be played by either one or two players. In the case of one player, the race is against the historical performances of boats which have sailed the actual race ("Historical Hall of Fame"), and also against players who have sailed the computer race before ("Player's Hall of Fame"). Only the best five players are listed in the Player's Hall of Fame. Competition is tough to get on and *stay* on the list.

TUTORIAL

After the program's introduction, the Bermuda Race Menu appears on the screen. Here, you may choose to go through a short, informative tutorial on basic sailing. This tutorial includes an introduction to basic nautical terms, such as "fore" and "aft," and several other terms associated specifically with sailing — "sheet," "line," "luff," and "leech." It discusses, as well, the points of sail, the compass, and some aspects of navigation.

The tutorial is not intended to teach the novice how to sail, or to coach the dinghy sailor on handling a modern "maxi-racer" of the Southern Ocean Racing Circuit. It is designed to ensure that all computer-based sailors have common knowledge of the terminology used in BERMUDA RACE.

BOAT PERFORMANCE

Use the next choice on the Bermuda Race Menu to review information about the performance of the simulated boat, and list the keyboard commands available to you. The boat simulated in the race is of the same general class as the NIRVANA, the 81' open-ocean racing boat that set a new race record in 1982.

Performance information is given in several tables: windspeed vs. boatspeed, boatspeed vs. relative wind angle, windspeed vs. maximum sail area, and windspeed vs. luff angle. This information is provided to help the computer sailor do his/her best in the race. By using the highly precise information supplied by the computer to manage your boat efficiently, it is occasionally possible to sail the Bermuda Race even faster than real boats have done, even though the boat simulated here is not quite as fast as the NIRVANA. The performance of your boat has been compared closely with that of the NIRVANA, and we think this simulation proves that with the right sailing conditions, the existing Bermuda Race records will be broken again!

THE SAILS

Your boat carries up to 2500 square feet of sail, which may all be "set" in "light air" or "medium air," or it can be decreased ("reefed") if the winds get too strong! Watch out for heavy winds because if you have too much sail set for the windspeed at the time, the wind "blows out" the sails. As a result, you lose some part of their effectiveness, just as you would in a real sailing situation. Of course, you are carrying a second, partial, set of sails, which you may raise after the wind abates (if it does!). But when your sails blow out, the portion lost is no longer available because you don't have a sailmaker in your crew or a sail loft on board!

While the race is in progress, press **S** to view the SAIL screen. On this screen you can see how much sail the boat can carry safely. You can also change the amount of sail area set. The computer continually calculates the maximum area of sails which may be set for the current windspeed. However, as you soon discover, the windspeed changes (as it does on the water) from move to move, and you may find that you have too much sail set, even though the computer indicated no problems on your last move!

THE CENTERBOARD

Your boat has a movable centerboard which can be used to change the performance of your vessel.

When the centerboard is down, your boat can sail "closer to the wind." That is, it can sail at a smaller angle (luff angle) to the wind and come closer to sailing in the direction from which the wind is blowing. But, as any experienced sailor knows, the higher the windspeed, the greater the luff angle, no matter what the centerboard position is.

As the centerboard is raised, the minimum possible luff angle is increased, meaning that you cannot sail as "close to the wind." Also, there is less "drag" in the water and the boat can go faster. So, make your choice about centerboard position to try optimizing the boat's performance for the sailing conditions at hand.

During the race, press **K** to get the KEEL (CENTERBOARD) screen. From this screen you can raise or lower the centerboard. The computer automatically calculates and displays the minimum luff angle for the current centerboard position and windspeed.

Because you cannot "trim" your sails optimally, the luff angle is programmed as a single function directly proportional to the windspeed.

START OF THE RACE

Before beginning the race, the computer asks whether there will be one or two players. After you press **1** or **2** (**RETURN** is not necessary), you have a choice of using either game paddles (press **P**), or arrow keys (press **A**) to input course changes. Again, **RETURN** is not necessary.

The program then proceeds to the Bermuda Race Registration where you enter the name of your boat and your name as captain. Answers to these questions should not contain commas, colons, or quote marks.

Next, you enter the date for recording in the Player's Hall of Fame (if you sail well enough!).

After the registration procedure, the computer loads and displays a chart of Rhode Island Sound. The starting line for the race is near Brenton Reef Light, near the Northwest shore of the Sound between Point Judith and Newport. It is marked on the chart with a dotted line. As in the real race, the start is timed. From the moment the chart flashes onto the screen, you have approximately 20 seconds to "read the wind," decide if you need to change course to prevent "luffing," and maximize boat speed across the starting line. The last 10 seconds of the countdown are displayed.

NOTE: YOU ONLY HAVE THE LAST TEN SECONDS BEFORE THE STARTING GUN to steer your boat onto the course you have chosen. To steer your boat, hold down the right or left arrow (and the **REPT** key on the Apple II or Apple II Plus), or turn the game paddles, until the desired heading is reached. While turning the boat, you may make adjustments to your course until the countdown ends. When the starting gun goes off, your boat is then on course as indicated and you cannot change until your next move.

In a two-player race, the computer turns immediately to the second player to start the countdown for his/her start; it then proceeds in an alternating fashion for each player's individual turn.

STEERING

Steering is accomplished by using the left- and right-arrow keys (and the **REPT** key on the Apple II or Apple II Plus), or by turning the game paddles, whichever you choose.

ARROWS: The ARROW KEY mode is indicated by a blinking left arrow <= = to the right of the indicated compass heading. The direction your boat is to sail is indicated by the compass heading displayed after the phrase **"STEER TO SHIP'S HEADING = =>"**. The right arrow turns the boat to starboard (right, or clockwise), and the left arrow turns it to port (left, or counter-clockwise). When the desired heading is achieved with the arrow keys, press **RETURN** to enter that value.

GAME PADDLES: GAME PADDLES may be used to enter headings simply by turning the knob until the desired heading is shown, and then pressing the paddle button to enter the heading. The GAME PADDLE mode is indicated by a non-blinking left arrow <= = to the right of the **"STEER TO SHIP'S HEADING = =>"** display.

X KEY: For your convenience, at any time during your turn and before your heading is entered, you may switch between the ARROW KEYS and GAME PADDLES by pressing **X**. There is no limit to switching between these methods for entering course changes.

SAILING

After you have entered a new heading, the computer calculates a new set of sailing conditions (windspeed, wind direction, wave height, boat efficiency, luff angle, etc.) and then determines the boat's new speed and position based on your desired heading and the new sailing conditions. This is as close to real experience as we can make it, because as any experienced sailor knows, you can plan all you want, but the wind and the waves will do what Nature directs and you can only react to what has already happened. You can make some guesses as to what you think the wind will do next, but Nature is always full of surprises!

If you are playing the simulation alone, the next turn begins immediately. The new sailing conditions are displayed on the screen allowing you to decide what heading, sail area and centerboard position changes need to be made to improve your speed or course, or to correct for what has happened.

If you and a friend are racing, the second player's turn begins immediately. This ensures that the second player does not gain any advantage by seeing the results of the first player's move. Only after the second player has entered his desired heading does the first player's results appear. Likewise, the second player's results do not appear until after the first player has entered his new course.

In the two-player race, each player decides his boat's heading, sail area, and centerboard position independently, although each has the same wind and sea conditions at the start of the race.

As an added feature, when the results of the second player's move are displayed, his position with regard to the other player is also displayed, e.g., the second player's boat is "X" miles ahead or behind. This is calculated according to how many miles each boat is from the finish line and not the distance one boat is from the other. After all, it is who gets to Bermuda first, on corrected time, that counts!

If a penalty is incurred, or a delay is encountered because of an accident or other event, the combined penalty and lost time is displayed for each player. This may be seen at the bottom of the boat's STATUS REPORT screen.

At any time before you enter the new heading, you may go to the HELP, SAIL, KEEL (CENTERBOARD), or CHART screens by pressing **H**, **S**, **K**, or **C**, respectively, to gain more information to help you decide what to do next. Likewise, you may return to the STATUS REPORT by pressing **R** when in any of the other screens.

THE CHARTS

Press **C** at any time during your turn to see your progress and position on the appropriate CHART. These charts are of the Newport area, the Atlantic, and the Bermuda area. As soon as the chart is displayed, your calculated position for each turn is plotted. Notice that even if you made no changes in heading for several turns in a row, your plotted course may appear at times to be somewhat different than you thought you steered. This is because the calculation of the boat's performance and its reaction to the elements, and thus its actual calculated course, also takes into account SET and DRIFT resulting from the wind, currents, sail area set, and centerboard position. In addition, when you are in the open Atlantic, you encounter the Gulf Stream. While it is not always of great significance, the Gulf Stream is a factor to be reckoned with.

When there are two players, the first player's position is plotted with a "+". The + is printed for the last position plotted on the chart when the chart is requested by the first player. The second player's positions are also plotted, if they are not already shown. If the second player requests the chart, all new positions, not already shown, are plotted with dots for both boats.

The chart for either the Newport area or the Bermuda area is displayed only when both players' positions can be plotted. This means that the Newport area chart is left as soon as the first player is off that chart, and that the Bermuda area chart is not shown until both players can be plotted on it. As a result, it is entirely possible for one player to cross the finish line and not be displayed on the Bermuda chart, if the other player is too far behind. The Bermuda chart does come up for display when the other boat "gets within range."

ACCIDENTS

As in any real sailing race, accidents can, and do, happen. We won't discuss all of the possible incidents programmed into the simulation, but be alert: they are out there, waiting, when you least expect them! Some can be prevented, but you may be in for a few surprises!

THE SIMULATION

The Bermuda Race simulation is based both on the performance of a composite of real 80′ LOA (length overall) maxi-racer sailboats of the class of the NIRVANA, and on their response to the speed and direction of the wind in the open Atlantic. Under certain conditions, our simulated boat may be seen to travel faster than the wind! While this may be surprising to some, it is in accord with the actual experience of several modern high-performance racers.

To make the race more exciting, we have biased the windspeed changes slightly to the high side. Thus, it is more likely to get high winds and large, steep waves than it is to have very light or no wind and low waves. However, after you race several times, you will discover that you get a share of all types of weather. We have not biased the direction of the wind, but you will find, as many sailors do, that the wind always *seems* to blow from the *wrong* direction. Because of the changeable weather, each race is different from every other race. One may sail straight from Newport to Bermuda setting a new record, while the next may wander all over the Atlantic. That's the sailor's lot! Good luck!

PLAYING TIME

A single-player race may be played in as few as 15 or 20 minutes, depending on race conditions, player skill, and luck. A two-player race takes just about twice as long in real time because of the double number of moves.

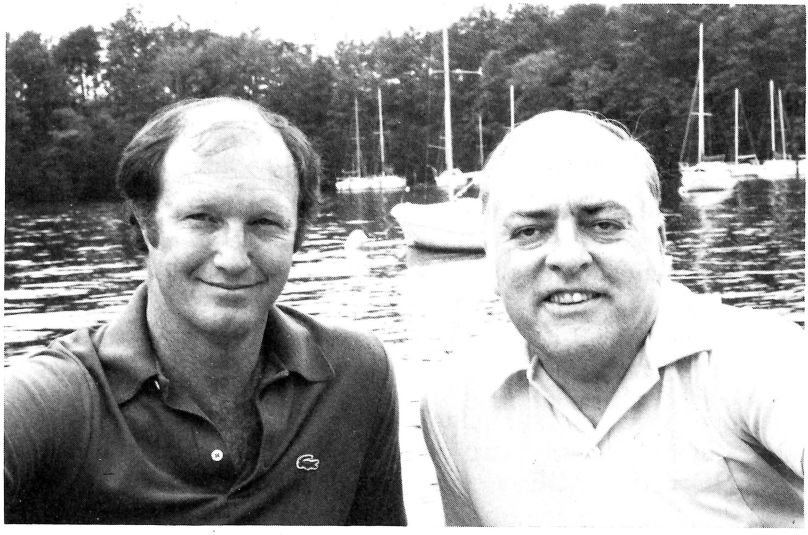
While you are on the Newport or Bermuda chart, the simulation time-steps are 15 minutes (0.25 hr.). On the main chart, the time-steps are every hour. Each player alternates with the other until one player reaches Bermuda. Then, the other player continues until he finishes the race. The winner is determined on the basis of corrected time, taking into account any penalties or delays, just like it is done in a real sailing race.

END OF THE RACE

Except during the start sequence, the race may be left at any time for a break, to take anti-seasickness pills, etc. Because of the nature of the simulation, there is no provision to save a partial race to disk. However, as part of the conclusion, the overall times of the best 5 races are saved in the Player's Hall of Fame. If your time does not better one of the first five races, you don't make it to the Hall of Fame.

At the conclusion of the single-player race, the computer takes you back to see the plots of the overall race on the main chart. Due to certain limitations, if the race is longer than about 90 hours, only the last few hours' plots are shown. This replay is not available on the two-player race.

GOOD LUCK, HAPPY SAILING, AND
MAY ALL YOUR WINDS BE FAIR!



John Biddle (left) and Gordon Mattox (right)

John Biddle is a U.S. Coast Guard-licensed captain who has sailed many different boats in various areas including the Atlantic, Caribbean, and Mediterranean. He has sailed many cruises as captain of the CT-54 sloop "The Great Escape" out of St. Thomas, U.S. Virgin Islands. In his "spare time," he works as a structural analysis engineer in the design and analysis of heavy industrial equipment.

Gordon Mattox is also a sailor with some experience, both in racing and cruising, in the Caribbean as well as in various larger inland waters. He is a sailing member of the U.S. Power Squadrons and is currently a Squadron Commander and member of the national Governing Board; he previously held various command and staff positions. He is also an engineer in heavy industry with experience in design, manufacturing, and marketing.

John and Gordon are co-authors of the programs that make up **BERMUDA RACE.** It was developed by utilizing both the Apple II Plus and the Apple III.